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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,330	07/18/2003	Shyam Keshavmurthy	DWH-11602/29	3284

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12/29/2005

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EXAMINER
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BARNES, CRYSTAL J

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/623,330	<b>Applicant(s)</b> KESHAVMURTHY ET AL.	
	<b>Examiner</b> Crystal J. Barnes	<b>Art Unit</b> 2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-4,7,9-11 and 15-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,7,9-11,15-19,21 and 22 is/are rejected.
- 7) ☒ Claim(s) 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The following is a second Non-Final Office Action in response to the Amendment received on 26 October 2005. Claims 5, 6, 8 and 12-14 have been cancelled. Claims 1-4, 7, 9-11 and 15-22 remain pending in this application.

#### *Drawings*

2. The replacement drawings were received on 26 October 2005. These drawings are acceptable.

#### *Specification*

3. The disclosure is objected to because of the following informalities:  
"sections 1 and 2" on page 8 line 12 and "methods 1-6" on page 9 lines 8-9 are unclear. Appropriate correction is required.

#### *Response to Arguments*

4. Applicant's arguments, see page 6 last paragraph, filed 26 October 2005, with respect to the rejection of claims 1-4, 9-12, 15, 18 and 21 under 35 USC 102(e) have been fully considered and are persuasive. Therefore, the rejection has

been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of USPN 5,398,193 to deAngelis and USPN 6,856,842 B2 to Rebello et al.

*Claim Rejections - 35 USC § 112*

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As per claim 16, the specification fails to disclose calculating undercut tool paths without tool or object reorientation.

*Claim Rejections - 35 USC § 102*

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-4, 7, 17, 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 5,398,193 to deAngelis.

As per claim 1, the deAngelis reference discloses an automated manufacturing method, comprising the steps of: receiving a description (see column 6 lines 24-25, "CAD/CAM representation") of an object to be fabricated ("prototype part") having a desired geometry (see column 4 line 41 and column 8 lines 32-35, "prespecified geometric tolerance"); identifying regions (see column 7 lines 41-46, "selected discrete areas of the discretized work surface") in which at

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least one automated material addition process (see column 7 lines 64-68, "materials additive processes") and at least one automated material subtraction process (see column 8 lines 7-12, "materials subtractive, extractive, or removal") should occur to fabricate the object ("prototype part") in accordance with the description ("CAD/CAM representation"); generating toolpaths (see column 7 lines 30-35 and column 8 lines 32-35, "control contours") associated with the material addition ("additive process") and subtraction processes ("subtractive processing"); and fabricating the object ("prototype part") in accordance with the toolpaths ("control contours").

As per claim 2, the deAngelis reference discloses the regions ("selected discrete areas of the discretized work surface") are layers (see column 6 lines 25-27, "layers"), volumes, lines or voxels ("slices").

As per claim 3, the deAngelis reference discloses the automated material subtraction process ("materials subtractive, extractive, or removal") includes milling (see column 8 line 12, "milling") or the use of lasers (see column 8 line 11, "laser"), knives, hot wires, arc cutters, or plasmas cutters.

As per claim 4, the deAngelis reference discloses the automated material addition process ("materials additive processes") includes solid-state or fusion

welding (see column 7 line 65, "power deposition and melting"), laser material deposition ("power deposition and melting"), metal spraying (see column 7 line 66, "plasma spraying"), or adhesive bonding.

As per claim 7, the deAngelis reference discloses further including the step of soft fixturing (see column 6 lines 46-51, "mask formation") multiple parts ("part layers").

As per claim 17, the deAngelis reference discloses further including the step of repairing (see column 8 lines 40-43, "complementary materials are deposited") an existing mold or other object ("empty regions of work surface").

As per claim 21, the deAngelis reference discloses certain features are deposited (see column 6 lines 63-66, "preformed masks") with excess stock ("gross contours") based on feature geometry (see column 6 lines 41-46, "desired geometry"); and removing material (see column 8 lines 7-11, "remove part and complementary materials") to enhance the deposition process (see column 7 lines 30-32, "materials additive"), or speed the build rate (see column 6 lines 50-51, "reducing the amount of additive processing") of the object ("formation of the layer").

As per claim 22, the deAngelis reference discloses further including the step of generating a conformal support material containment structure (see column 6 lines 55-59, "mask contours").

9. Claims 1-4, 9-10, 15, 18 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,856,842 B2 to Rebello et al.

As per claim 1, the Rebello et al. reference discloses an automated manufacturing method, comprising the steps of: receiving a description (see column 2 lines 33-41, "parametric model 70") of an object ("part 10") to be fabricated having a desired geometry ("geometry"); identifying regions ("holes, lines, curves, chamfers, blends, radii") in which at least one automated material addition process (see column 3 lines 4-9, "material addition") and at least one automated material subtraction process ("material removal") should occur to fabricate ("manufacturing") the object ("part 10") in accordance with the description ("parametric model 70"); generating toolpaths (see column 3 lines 9-10, "tool path generation") associated with the material addition ("material addition") and subtraction processes ("material removal"); and fabricating ("manufacturing") the



object ("part 10") in accordance with the toolpaths (see column 3 lines 40-42, "tool path").

As per claim 2, the Rebello et al. reference discloses the regions ("holes, lines, curves, chamfers, blends, radii") are layers, volumes, lines ("lines") or voxels.

As per claim 3, the Rebello et al. reference discloses the automated material subtraction process ("material removal") includes milling or the use of lasers (see column 3 lines 42-43, "lasers"), knives, hot wires, arc cutters ("cutters"), or plasmas cutters ("cutters").

As per claim 4, the Rebello et al. reference discloses the automated material addition process ("material addition") includes solid-state or fusion welding, laser material deposition (see column 3 lines 5-6, "deposition"), metal spraying (see column 3 lines 43-44, "laser cladding"), or adhesive bonding ("laser cladding").

As per claim 9, the Rebello et al. reference discloses further including the step of blending the regions (see column 3 lines 35-37, "continuity or other matching conditions") to eliminate seams ("adjoining tooling features") that would be generated due to the subtractive process ("material removal") used.

As per claim 10, the Rebello et al. reference discloses further including the step of creating enclosed (see column 3 lines 21-30, "airfoil 11") and overhanging

features ("dovetail 12") using the additive ("material addition") or subtractive manufacturing processes ("material removal"), or a combination thereof.

As per claim 11, the Rebello et al. reference discloses further including the steps of: identifying changes (see column 2 lines 65-67, "changed") in the desired geometry ("underlying parametric model"); removing excess material ("context model ... change") to achieve the desired geometry ("underlying parametric model").

As per claim 15, the Rebello et al. reference discloses further including the step of generating enclosed cavities (see column 3 lines 21-24, "cavity tooling geometry") within the object ("blade 10") during the fabrication ("manufacturing") thereof.

As per claim 18, the Rebello et al. reference discloses a tool path (see column 3 lines 40-48, "tool path") associated with additive processing ("material addition") is based on the nature of the additive process ("material addition") used.

As per claim 19, the Rebello et al. reference discloses further including the step of incorporating negative draft angles (see figure 2, "dovetail 12") using the additive ("material addition") or subtractive processing ("material removal").

*Allowable Subject Matter*

10. Claim 20 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to rapid prototyping in general:

USPN 6,280,784 B1 to Yang et al.

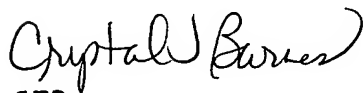
USPN 5,958,134 to Yasar et al.

US Pub. No. 2005/0173380 A1 to Carbone

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Crystal J. Barnes whose telephone number is 571.272.3679. The examiner can normally be reached on Monday-Friday alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 571.272.3687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



CJB

22 December 2005